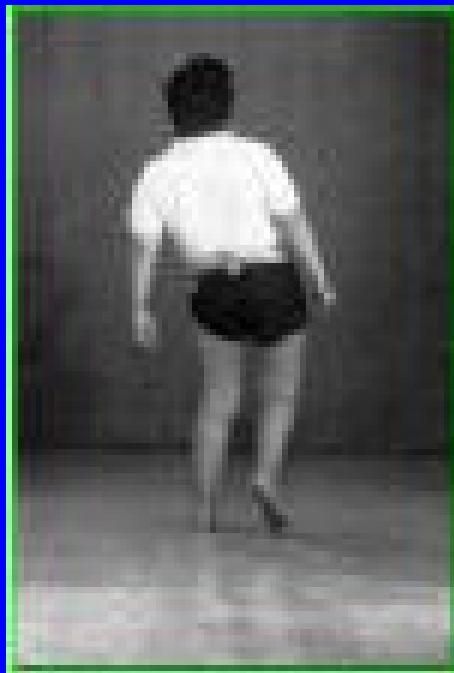


The Limping Child



**Christopher M. Prior, DO
MAJ, MC, USA
Primary Care Sports
Medicine**

Studying can be Hazardous



Objectives

- Review gait types
- Proper Work Up:
 - Potential etiologies
 - Use age to narrow differential
 - Thorough History and Physical
 - Appropriate Test
- The Fab Five

Basics of Gait Types

- Asymmetric Deviation from the normal gait
- Normal gait pattern:
 - 60% stance
 - 40% swing

Stiffed Leg
Antalgic Gait

Trendelenberg
Waddling

- Increased time in the swing phase to avoid bearing weight on the injured extremity

Stooped
Toe Walking

Steppage
Slow deliberate

- By age 5 most kids have an adult gait pattern

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Etiologies of the Limping Child

- Trauma:

- Tumor:

- Musculoskeletal
Collapsing

- Inflammatory:

- Congenital:

- Developmental:

- Legg-Calve-Perthes

Etiologies of the Limping Child

- Trauma:
 - Fracture (Stress, Toddlers') Soft Tissue, Ankle Sprain, Foreign Body, Ingrown toe nail
- Tumor:
 - Spinal Cord, Bone (Benign & Malignant), Lymphoma, Leukemia
- Infection:
 - Cellulitis, Osteomyelitis, Septic Arthritis, Lyme Disease, TB, GC, Postinfectious Reactive Arthritis
- Inflammatory:
 - Juvenile Rheumatoid Arthritis, Transient Synovitis, Systemic Lupus Erythematosus
- Congenital:
 - Hip Dysplasia, Sickle Cell, Short Femur, Club Foot
- Developmental:
 - Legg- Calve-Perthes Disease, Slipped Capital Femoral, Epiphysis, Tarsal Coalition, Osteo Chondral Defect, Neuro

Potential Etiologies

- | | |
|-----------------------------------|--------------------|
| Juvenile Rheumatoid Arthritis | Septic Hip |
| Toxic Synovitis | Hip dysplasia |
| Legg-Calve-Perthes | Occult Fracture |
| Slipped Capital Femoral Epiphysis | Length Discrepancy |
| Avascular necrosis | Septic Arthritis |
| Overuse | Osteomyelitis |
| Tarsal Coalition | Cellulitis |
| | Stress Fracture |
| | Neoplasm |
| | Neuromuscular |
| | GC Arthritis |

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Age Related Etiologies of the Limping Child

All Ages

Septic Arthritis

Osteomyelitis

Cellulitis

Stress Fracture

Neoplasm

Neuromuscul

Arthritis

0-3 Years

Septic Hip
Hip dysplasia
Occult Fracture
Length Discrepancy

4-10 Years

JRA
Toxic Synovitis
Legg-Calve-Perthes

All Ages

Septic Arthritis
Osteomyelitis
Cellulitis
Stress Fracture
Neoplasm
Neuromuscular

11-16 Years

SCFE
AVN
Overuse
Tarsal Coalition
GC Arthritis

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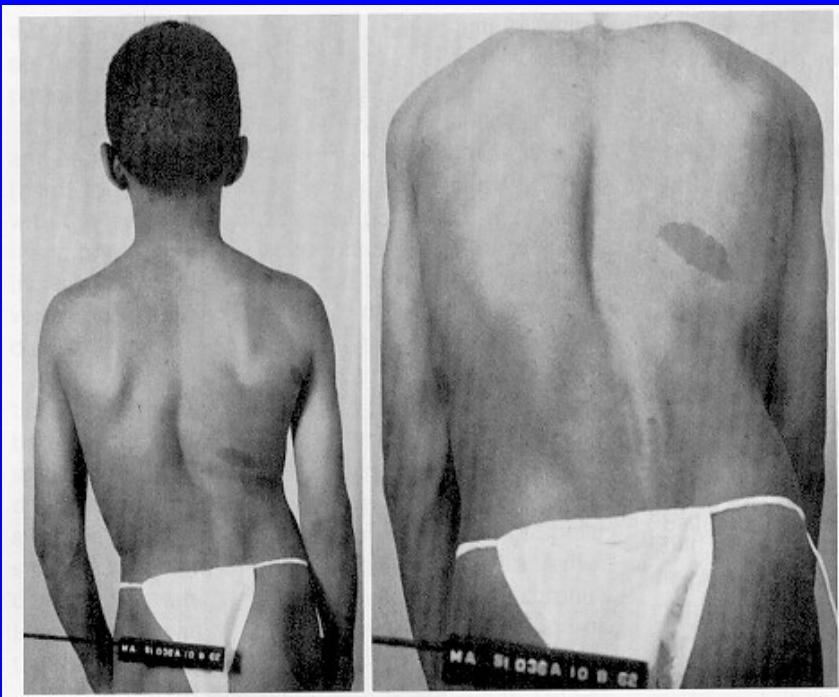
Proper Work Up: History

- Onset and Type of Pain
 - Improving/Worsening
 - Worse in morning or evening
- Ambulatory or not
 - If younger, will the child crawl
- Review of systems
 - Recent illness
 - Birth and Family History

Physical Exam

- Walk on toes, heels, hop, and run
- Feet for claw toes or cavus feet
- Deep tendon reflexes and clonus
- HIP EXAM-ROM & SPECIAL TESTS
- Skin and GU/Abdominal Exam

Limp: Back

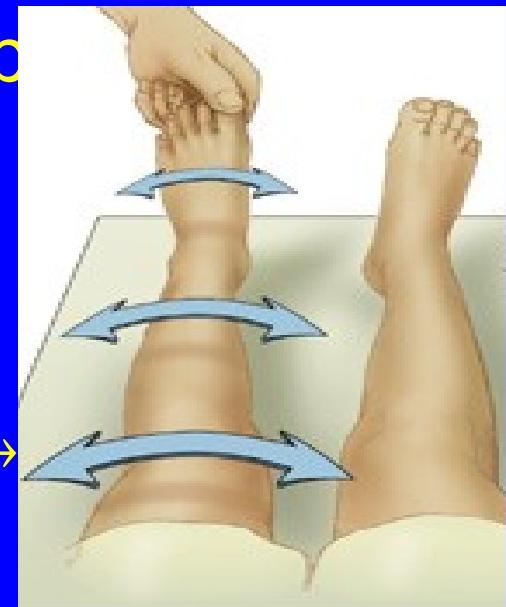


Hip Exam

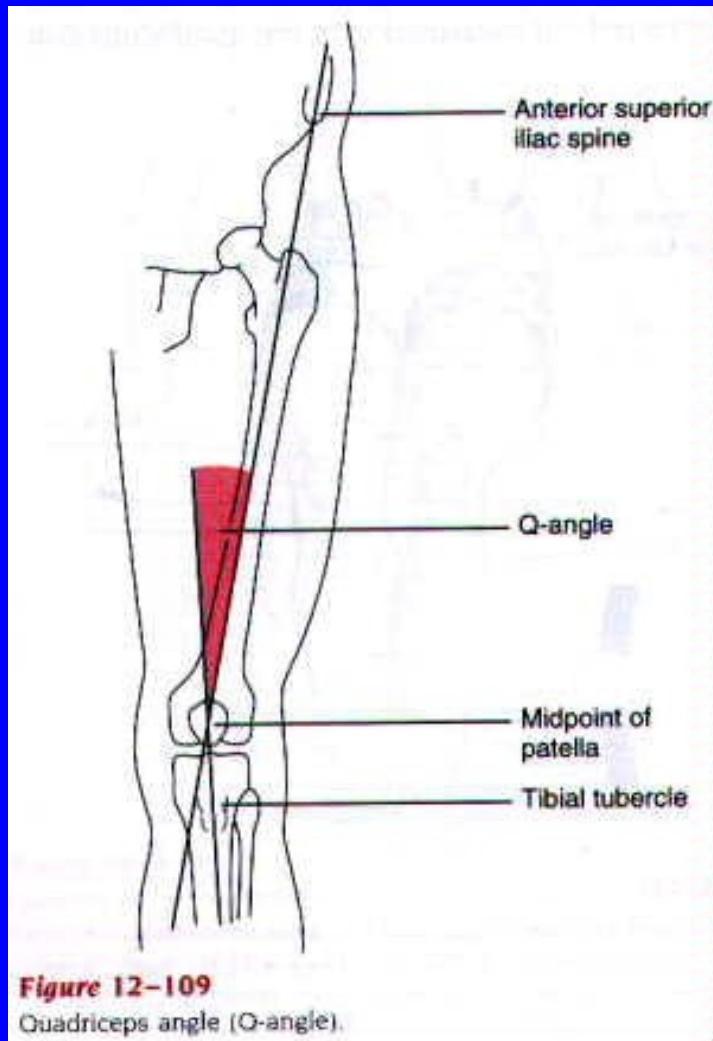
- Position of maximum volume and least pressure: Flexion, Abduction, Ext Rotation
- Decreased Internal Rotation suggest Hip Pathology
- Place Patient Prone and Comp (most sensitive test)



or log roll→



Limp: Knee



Limp: Feet



Pes Planus



Pes Cavus

Objectives

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Appropriate Tests: Labs

- CBC If more than 2 cell lines down consider malignancy
- C-Reactive Protein &/or ESR
CRP More Sensitive and Earlier
- Joint Fluid Cell Count ($>50K$ =infection) and Culture pos 36% - 79%
- Blood Culture Partial Treatment with Antibiotics
+ $\leq 50\%$
- Lyme Titers/ANA/ RF/HLA

Appropriate Test: Radiology

- Radiographs
 - Lateral
 - Frog
- Ultrasound
 - Fluid collections
 - Aspiration and Injection
- Bone Scan
- Ortho Consult

Take Study “BRAKES”



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The Fab Five



Five Etiologies of Limp

- Growing Pains
12-16 years old
- Legg-Calve-Perthes Disease
4-10 years old
- Slipped Capital Femoral Epiphysis
11-16 years old
- Toxic Synovitis
4-10 years old
- Septic Arthritis
Any age

Growing Pains

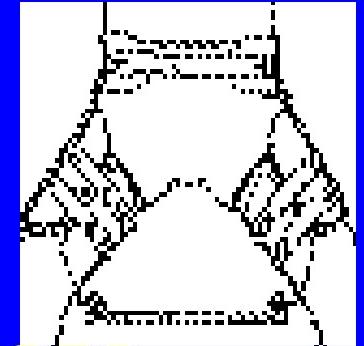
- Reported affect 40-80 %
- Leg Pain is Bilateral, nocturnal
- Etiology
- More common in males
- Supportive treatment, relative rest
- No long term sequelae

Legg-Calve-Perthes Disease

- “Painless Limp” caused by AVN of femoral head
- Symptoms may be referred to thigh and knee
- Unknown etiology-but there is interrupted blood supply of femoral epiphysis
- 5:1 Male Predominance
- Usually 4-8 years to age

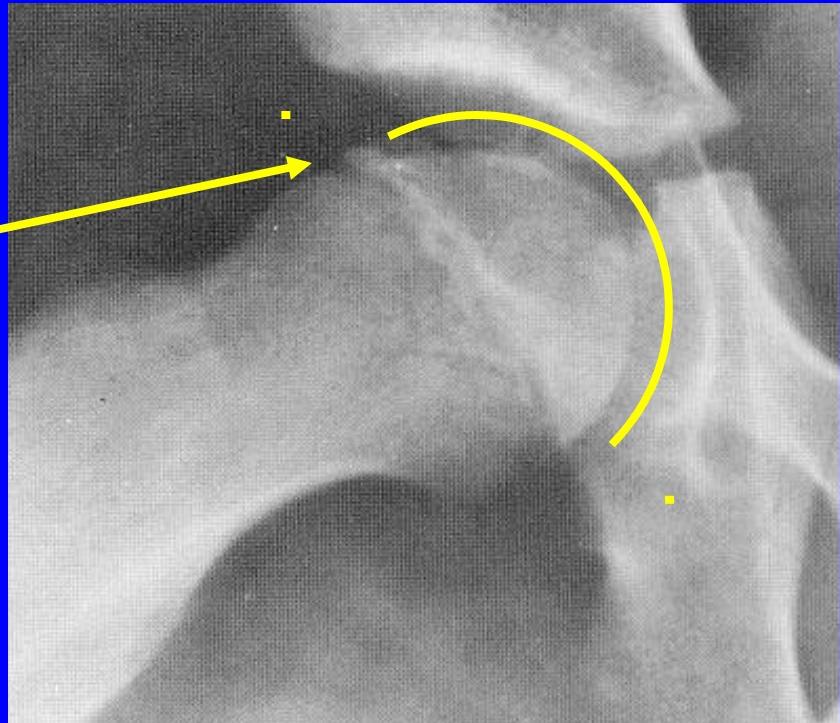
Legg-Calve-Perthes Disease

- Treatment Key is to containment of femoral epiphysis in acetabulum
- If <50% Femoral Head involved Observation
- If >50% Femoral Head involved cast, brace or operate
- All suspected and confirmed cases should be referred



Legg Calve Perthes-Various Xrays

Crescent sign



Slipped Capital Femoral Epiphysis

- Slippage of Proximal Femoral Epiphysis on the Femoral Neck through the Physeal Plate
- Occurs during Adolescent Growth Spurt
- Most Common Hip Disorder of Adolescents (2 /100K)
- Symptoms to Diagnosis 10 months
- Missed on initial exam up to 50 %



Slipped Capital Femoral Epiphysis

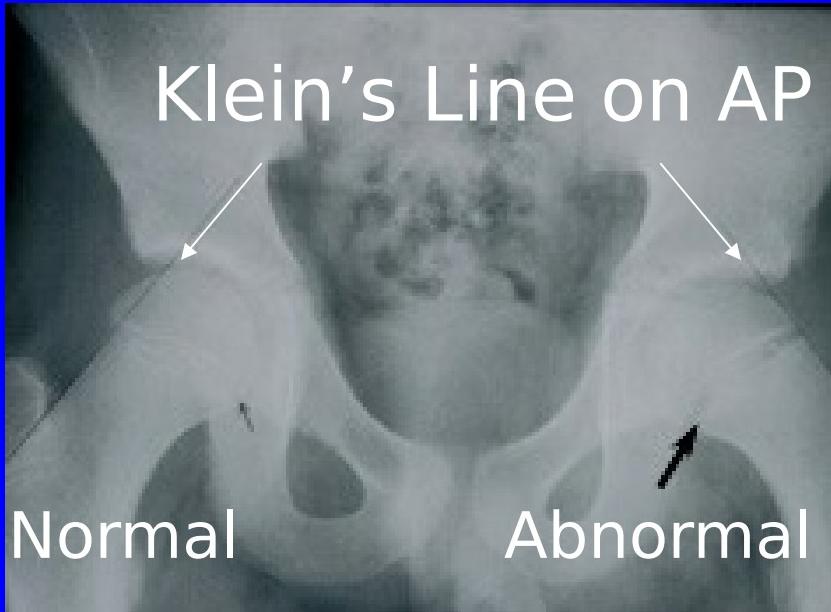
- Male/Female 1.5/1
- Usually Obese or Tall Thin adolescents
- More Common in Blacks and Polynesians
- Only 25% w history of Trauma
- Occurs 25-40% Bilaterally



Slipped Capital Femoral Epiphysis

- Stable 90% vs. Unstable 10%
- Exam- Decreased Internal Rotation & Obligate Ext Rotation w Hip Flexion
- If severely limited Active ROM, do not test passively until X-rays obtained (may displace epiphysis even further-may need X-table lateral)





Slipped Capital Femoral Epiphysis



Surgical Pinning



Toxic Synovitis

- Most Common Cause of Hip Pain under 10
- Diagnosis of Exclusion
- Etiology unknown (? Post-viral)
- Males 2:1 predominance
- Treatment is Supportive
- Late Sequelae:
 - Coxa Magna
 - Legg-Calve-Perthes disease
 - Degenerative cystic changes of femoral neck

Septic Arthritis vs Toxic Synovitis

- Hip is most common joint involved in Septic Arthritis
- There is frequently a Hx of Trauma and or URI
- Most Common etiologies are *S. aureus* and *Strep* species (*H. influenza* is rare now due to Hib vaccine)
- Also get Blood Cultures if Septic Arthritis is considered

Septic Arthritis vs Toxic Synovitis

		<u>Septic Arthritis</u>	<u>Toxic Synovitis</u>
↑ WBC	(>12K)	15K	9K
Refusal to Bear Weight		95%	35%
Fever	(>37.5°C)	82%	8%
↑ ESR	(20mm)	51mm	21mm

- 3 out of 4 Mandates Aspiration
- Be Wary if Partially Treated w/ Oral Antibiotics

Kocher, et. al J Bone Jt Surg Dec 98

Conclusion

- Remember Age Specific Diagnosis
- Always Consider Infection and Neoplasm
- Strongly Consider CBC, CRP &/or ESR
- Temp $\geq 38^{\circ}\text{C}$ (100°F)/ESR >20 = Tap Hip
- Frog and lateral X-Ray
- Decreased Internal Rotation is Bad

Questrion #1

A patient with which one of the following should raise suspicion of septic arthritis?

- 1) ESR of 5mm/hr 
- 2) Temp > 37.5°C (99.5°F)
- 3) Bilateral hip pain radiating to the knee
- 4) Bilateral wrist and knee pain

Question #2

11 yo male with hip pain comes to office, on examination his right hip externally rotates every time you flex his hip. This presentation is most consistent with a diagnosis of:



- 1) Slipped Capital Femoral Epiphysis
- 2) Developmental Dysplasia of the Hip
- 3) Duchene's Muscular Dystrophy
- 4) Juvenile Rheumatoid Arthritis
- 5) Transient Synovitis

Question #3

- How can you narrow down the work up a patient with a limp?

0-3 Years

Septic Hip
Hip dysplasia
Occult Fracture
Length Discrepancy

4-10 Years

JRA
Toxic Synovitis
Legg-Calve-Perthes

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Thank You

